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Flower Shows and their Uses.

IN our report of the Philadelphia Flower Show last week, regret was expressed that so few real Spring flowers were exhibited. The season was still young and backward, it is true, but in the very same paper it was stated that some of the early Irises, like I. Histrio and I. Bakeriana, were showing their beautiful and fragrant flowers in the neighborhood of this city, while the ground about them was frozen hard. Of course, there were Snowdrops and Crocuses in many Philadelphia gardens at that time, and with the help of sashes and no other heat than that from the sun, spring flowers could have been shown in great abundance and variety and with that unique charm which invests these earliest reminders that the winter is past and the time of the singing of birds has come. These flowers then were not absent there because it was impossible to procure them, but because the burden of preparing the exhibition fell chiefly upon commercial dealers and growers. Of course, there were many admirable exhibits from private collections. A flower show in Philadelphia without specimen plants from the collections of Miss Baldwin, Mr. Drexel and Mr. Childs can hardly be imagined now; but besides these noteworthy plants, the preparation of the great body of the show, and of the flowers in particular, devolves upon those who sell them or raise them for the market. Very naturally, these men grow plants for which there is a demand, and they exhibit what they grow to perfection. One never fails, therefore, to see at our exhibitions Roses and Carnations, Lilies and Cytisus, with similar plants in their season, and beyond these little else. Just now the florists are unusually busy with Easter work, and this makes it still more difficult for them to prepare anything for exhibition which is not directly in the line of their business.

Of course, no one can criticise such exhibitors for limiting their display to this class of flowers. On the contrary, we should feel inclined to thank them for showing flowers of such perfection and finish, for no one grows them better. But, after all, it is plain that one sees nothing at a flower show conducted on this plan which cannot be seen in a florist's window, and certainly the show would be more attractive and more instructive if visitors could find there something which they have no opportunity of seeing elsewhere. We have spoken of a few of the Irises which were blooming a fortnight ago. The truth is, that the entire Reticulata group of these plants, with the exception of the type, could have been had in flower out-of-doors a week ago, while the type itself and many others, like I. Persica, could have been flowered at the same time in a cold frame. There are no more beautiful flowers than these, and every lover of hardy plants at Philadelphia would have been delighted at the opportunity of seeing the different varieties together, and noting their similarities and distinctions.

Again, few people know any other than the common Snowdrop, Galanthus nivalis, and, perhaps, the Crimean Snowdrops, but there are a score or more of distinct varieties which can now be obtained, and half a dozen of them, at least, are good species. The varieties of Narcissus have multiplied almost beyond computation, but all the types except the latest ones could have been easily brought forward in a cold frame, so that they could have been admired and studied together at Philadelphia. Scillas and Bulbocodiums were already open in the borders, and Spring Snowflakes, Fritillarias and Chionodoxas, if slightly protected, might have kept them company. Anemone blanda has been flowering all through February in the open air, and in a cold frame many other varieties could have been brought forward. The lovely Winter Aconite, the hardy Primroses, the Lenten Roses and many strictly alpine plants could have been had with little trouble; but there is no need to continue the catalogue. It is enough to say that at this time, and a little later, when the Tulip species will come into bloom, there could be brought together in this latitude a group of flowers that would rival in beauty and excel in poetic charm any collection of outdoor blooms made at any other season.

Now, to insure the exhibition of such flowers, it is necessary to interest those who grow them. In the vicinity of New York, Boston and Philadelphia there are many persons who cultivate, for example, a great variety of garden Narcissi, and yet we have never seen anything like a comprehensive exhibit of these plants. The same is true of Snowdrops and other genera. The mere offering of premiums by societies will hardly suffice to induce growers of such specialties to exhibit their pets, but a direct appeal to those who are known to have such collections might perhaps avail. Again, why should not horticultural societies offer sufficient premiums to induce commercial growers to arrange for exhibits of this kind? The men who have bulbs for sale could hardly devise a better way of advertising them than by an exhibit of their flowers in early spring. Can it be doubted that if a group of spring Irises in flower had been exhibited in Philadelphia a fortnight ago many of the visitors would have at once prepared for a similar exhibition in their own gardens next year? If the men who sell seeds, plants and flowers wish to educate people as to the best varieties there certainly is no surer way to do this than by exhibiting them, so that every one can learn how beautiful they are.

These exhibitions by the great societies now give pleasure to thousands. If the plan on which they are conducted were broadened out in the direction we have indicated they would have a much higher value as educating forces and essential factors in the horticultural progress of the country.

MANY warnings, which might well be heeded by the guardians of our public forest-lands, have come down from past ages embalmed in literature; and the beauty of form which has preserved them adds to the impressiveness of their counsel. That this counsel, although repeated a thousand times for thousands of years, is still disregarded, proves how hard it is for a knowledge even of firmly established facts of the highest practical importance

to implant itself in the conscience of the people at large. In these latter days should our people still need to be told the same truths which Virgil needed to tell nearly two thousand years ago? His words were spoken of artificially established young plantations, but they are just as applicable to young plantations which Nature is establishing, and to older ones where the undergrowth should be preserved:

> Guard, too, from cattle, thy new planted ground,
> And infant vines that ill can bear a wound;
> For not alone by winter's chilling frost,
> Or summer's scorching beam the young are lost;
> But the wild buffaloes and greedy cows,
> And goats and sportive kids the branches browse;
> Not piercing cold nor Sirius' beams that beat
> On the parched hills, and split their tops with heat,
> So deeply injure as the nibbling flocks,
> That wound with venomed teeth the tender, fearful stocks.

Then, could any testimony be clearer than that which is borne by John Evelyn in his *Sylva*? "Our main plantation," says this famous seventeenth-century authority on silviculture, "is now finished and our forest adorned with just variety. But what is yet all this labor, but loss of time and irreparable expense, unless our young and (as yet) tender plants be sufficiently guarded with munitions from all external injuries? For, as old Tusser,

> If cattle or coney may enter to crop,
> Young Oak is in danger of losing his top.

The reason that so many complain of the improsperous condition of their woodlands and plantations of this kind proceeds from this neglect. . . . If through any accident a beast shall break into his master's field, or the wicked hunter make a gap for his dogs and horses, what a clamor is there made for the disturbance of a year's crop, at most, in a little corn! whilst abandoning his young woods all this time, and perhaps many years, to the venomous bitings and treadings of cattle, and other like injuries. . . . the detriment is many times irreparable, young trees once cropped hardly ever recovering. It is the bane of all our most hopeful timber. But shall I provoke you by an instance? A kinsman of mine has a wood of more than sixty years' standing. It was, before he purchased it, exposed and abandoned to the cattle for divers years. Some of the outward skirts were nothing save shrubs and miserable starvelings; yet still the place was disposed to grow woody, but by this neglect continually suppressed. The industrious gentleman fenced in some acres of this, and cut all close to the ground; and it is come in eight or nine years to be better worth than the wood of sixty, and will, in time, prove most imcomparable timber; whilst the other part, so many years advanced, shall never recover. . . . Judge then by this how our woods come to be so decried! Are five hundred sheep worthy the care of a shepherd? And are not five thousand Oaks worth the fencing and the inspection of a hayward?"

And are not our great public forests in the west, where we want the trees to grow well in order that they may serve the interests of beauty as well as of utility, worth a protection which does not mean a fence and a "hayward," but a systematic guarding against danger from fire and, equally, against danger from the flocks and herds of unscrupulous individuals, intent upon private gain at the expense of the people's property?

Notes of a Summer Journey in Europe.—XXIV.

IN spite of our knowledge of the modifying influence of the Gulf Stream on the climate of the west coast of Europe, it is often difficult for Americans to realize that places situated geographically so much farther north enjoy a winter temperature which is in every way so much more moderate than prevails in our New England and northern states.

The Botanic Garden at Edinburgh, in Scotland, furnishes as interesting an object for comparison as may generally be found if we study climatic differences by the plants which it is possible to grow in any given region, and, as a rule, the character of the vegetation gives a pretty correct indication of the temper of the climate. Edinburgh is situated very nearly in latitude fifty-six degrees, a position approximately equivalent to the northern coast of Labrador, on our Atlantic seaboard; to a point not very far south of Sitka, on the Pacific coast, and between thirteen and fourteen degrees farther north than central Massachusetts. But so moderate is the winter climate that many New Zealand, Tasmanian, Indian and South American plants flourish in the open air here which we should not dream of leaving out-of-doors in winter if we wished to keep them alive and in good health.

The Botanic Garden at Edinburgh is generally considered one of the best-kept and best-arranged in Europe, although it may be surpassed in area. Its origin dates from 1670, when it was founded by Sir Andrew Balfour, with assistance from Sir Robert Sibbald. Thirteen years later, the first curator of the garden, James Sutherland, published a catalogue of the plants in it, which is said to have contained about 3,000 species. In its history of over two hundred years the garden has occupied three different sites, occupying the first for ninety-three years, the second for fifty-six, and finally being removed to its present location in 1819. The area included in this garden was a little over twenty-seven acres, and this is what is called the garden to-day. But within the last twenty years an area of equal extent has been added, which is called the arboretum, so that the whole now comprises about fifty-five acres of diversified land with varied exposures.

The area at command has been very well utilized, so that there is little waste, and not much crowding, although the number of species in this garden is by no means small. One is likely to be impressed with the compactness and general prettiness of the garden upon first entering the main gateway. The arboretum, at the farther end of the garden, may not seem so interesting and picturesque, because its trees are not so old or so fully grown, and it has the aspect of comparative newness; but it contains much that is valuable to the student of woody plants. The shrubs have generally reached the best state of development, and some of those which we would consider beyond question too tender for our gardens seem to thrive here and lend a peculiar interest to the collection. Some of the so-called "Prickly Heaths," Pernettya mucronata, from the Straits of Magellan, seem quite at home. I noted this species fruiting in great abundance, the ripe fruit being about the size of peas and of a pretty bluish color. The most interesting point in connection with it I found in the seed, which, while still in the mature fruit on the plants, had germinated and formed perfect little plantlets. The leaves of this shrub are small, shining, dark green and persistent. The plant belongs to the Heath family, and the fleshy berries seem quite as edible as those of some of our Huckleberries, although they are somewhat drier.

Another South American plant which appears to do fairly well here is Buddleia globosa, which, while it may not reach the size and height possible in warmer regions, is here represented by very broad-spreading specimens eight or ten feet high. It bears orange or honey-colored flowers in large globose terminal heads, and is also peculiar in the densely hoary tomentose character of the branches and under-surfaces of the leaves. Among other woody plants from the southern hemisphere, those from New Zealand and Tasmania are at once the most conspicuous and the most numerous in species. The so-called Daisy-tree, Olearia Haastii, is interesting as being a woody Composite which, in New Zealand, attains the proportions of a good-sized tree. Transplanted to the northern hemisphere, it blossoms in August and September, the last of the numerous heads of small white flowers, in corymb-like cymes, just fading away when I saw the Edinburgh plants at the end of September. It is not unknown in American gardens, but cannot be grown in the north. Some of the shrubby New Zealand Veronicas thrive fairly well in the open air here, although they are liable to severe injury or destruction in unusually rigorous winters. One of the best goes under the name of Veronica Traversii, and here forms a smooth-branched bushy shrub several feet high, with opposite leaves looking something like those of Box. It is a very pretty object when covered by the innumerable little white flowers which it bears.

Several species of Fuchsia live here in the open air throughout the year and bloom quite satisfactorily. Some Escallonias survive the winters, especially if planted in the shelter of a warm wall, and some small shrubby Polygonums are quite effective in certain uses in gardening. There is quite an interesting and rich collection of species of Fragaria and Potentilla, and among the latter the long-known, but rare, shrubby and white flowered Potentilla glabra of Loddiges was seen. Although a native inhabitant of a cold northern region, and quite hardy, this species seems to be almost lost to cultivation.

Its flowers are about as large as those of the yellow blossoms of the well-known P. fruticosa. Saxifrages, too, are well represented by a very large number of species, each in good distinct clumps.

The Edinburgh Botanic Garden is perhaps more famed for its pretty rock-garden than for any other single feature. This was constructed of rocks from a stone wall by the late curator, James M'Nab, and its good order and its interesting character are still maintained by Mr. Lindsay, who has the active charge now. It is prettily built, without any more formality than is necessary in a structure of this kind in such a place, and it is on the whole probably one of the best, if not the very best, of rockeries in any public garden. It is divided into numerous sections, and these are again subdivided into several thousand compartments, or pockets, for the reception of the different species and varieties of alpine and hardy dwarf herbaceous and small shrubby plants. Bulbs, of course, are also included, so that Crocuses and Snowdrops may be found at the end of winter, and Crocus speciosus and others and the showy Colchicums in the autumn. Of the species of the latter genus, C. speciosum is one of the largest in cultivation and is very handsome. With such plants as the Hellebores and Erica carnea in the collection, good flowers may in some seasons be found almost every week of the year. The collection of Ferns in the rockery is a very neat and creditable one. Among the autumn-blooming plants in the rockery, several species of so-called Knot-weed, or Polygonum, were very interesting, those specially noted being P. affine, P. capitatum and P. vaccinifolium, all north Indian, the last more particularly Himalayan. The individual blossoms of all these are small, but as they are borne in dense spikes, or heads, and quite abundantly they make a pretty show. P. affine produces rosy red flowers; those of P. capitatum are pink, in dense round heads, while the blossoms of P. vaccinifolium are of a bright rose color and are produced on comparatively long and nearly cylindrical spikes. This last species has distinctly woody stems, is a low, prostrate, much-branched trailer, and is one of the best of its genus and one of the most interesting and useful plants in cultivation for planting in rock-work and such places. It is especially valuable because it will continue in good bloom from August till November. It is not likely, however, to be found quite hardy in our northern New England climate.

In the collection of trees the Conifers are represented by a large series of species, though they are much crowded and none of them have attained any notable size. The species of Yews, Arbor Vitæs, Chamæcyparis and Cedrus appear in better condition than those of most other genera. Araucaria imbricata grows well, and so does Sequoia gigantea, though straggling in appearance. Other places in Scotland are famous for the growth of exotic Conifers, and of them all the Douglas Fir or Spruce is one of the very best.

To most Americans in Europe the Mistletoe has a particular interest, and in the Edinburgh Botanic Garden there is an unusually handsome specimen encircling the trunk of one of our Pin Oaks (Quercus palustris) at five or six feet from the ground, so that it is in just the best position for public view. This parasite has found congenial hosts in quite a number of species of American trees which have been transplanted to the Old World.

Arnold Arboretum. *J. G. Jack.*

Native Plants for Winter Decoration.

WINTER began in good earnest in the Pines about the 20th of December, and since then walking in the woods, or anywhere else, except in paths prepared by the snow-shovel, has been almost impossible. A few days ago, however, I ventured on a ramble, and found the wild plants in all my favorite haunts none the worse for the season's severity, and ready, at the earliest suggestion of spring weather, to put forth bud and blossom.

But no winter is so inhospitable as to shut us out entirely from companionship with our native plants, especially if we have prepared a wild-garden. One day when the mercury had fallen almost to the zero mark I brought in some twigs of Alder (Alnus serrulata) and placed them in a vase of water, and I was amazed to see how rapidly they developed. In less than a week the clusters of long, sterile, drooping catkins were in full flower, so that I was obliged to place them in the wind to let it blow away the superabundant pollen-dust. It was several weeks after this before any appreciable growth was observed on plants in the open ground. But on the 8th of March a warm rain came, and the catkins lengthened half an inch or more in a single night. Then it grew colder, and growth was arrested until the next warm period.

The catkins of the Filbert, both European and American, develop with even more rapidity than those of the Alder, both indoors and out. I placed some twigs of a European species in tepid water in a warm room, and in less than twenty-four hours the clusters of sterile catkins were three inches in length, and the small, fertile blossoms were peeping out from their scaly buds with bright red pistils at the base of the sterile flowers. And what can be more charming in winter than a vase of red, shining twigs of some of the Willows which soon disclose the soft, silky "pussys" that always delight the young folks? Lessons like these in winter make more vivid and lasting impressions on children, while mostly shut within doors, than the same plants do in the spring, when the attention is diverted in so many ways.

Twigs of both the Soft Maple and of the Swamp Maple make handsome indoor ornaments, and the red blossoms appear very quickly. These Maples usually flower with us in February, sometimes even earlier, but this season they did not commence to blossom until early March. But one of the most desirable of all these early-flowering trees for winter bouquets is the ash-leaved Maple (Acer Negundo). The green bark of the twigs makes a fine contrast with the red ones of the Willow and the brown ones of the other Maples, and the delicate drooping clusters of greenish flowers are quick to appear.

Branchlets of the various species of Oak are also interesting, as they put out their yellow flowers rapidly in warmth and moisture. All of the Elms, too, respond quickly to this treatment, soon rewarding us with their small, bell-shaped flowers, with long slender, exserted stamens. Some of the flowers are purplish, others yellow. Twigs of the Hickory are specially pleasing. Our warm rooms soon cause the buds to expand, and the flowers become eager to push off the numerous wrappings in which they are enclosed. These large, scaly, resinous buds have a delicious fragrance of the woods, which is so exhilarating in early spring.

One of the most fragrant, delicate, aromatic trees from which to make our selection is the Sweet Gum. The globular heads of fruit formed the previous season are still gracefully hanging from their long slender stems, and the quaint and fanciful, corky-ridged branchlets are ready to put forth their numerous flowers almost as soon as we place them on the table. Many of our wild-flowering shrubs are also admirable for forcing in winter. Cassandra calyculata, whose flower-buds formed in the summer, expand very quickly in a warm room, forming long one-sided racemes of little white bells among the small evergreen leaves. The Shad Bush (Amelanchier Canadensis) is excellent for winter-flowering, and so is the wild Crab-apple, which has fragrant rose-colored blossoms.

Among low-growing plants the Trailing Arbutus is one of the most satisfactory. A clump of this kept moist and warm will soon repay us with handsome clusters of fragrant flowers. And our charming Pyxie will quickly unfold its pretty blossoms among its tiny evergreen leaves.

Vineland, N. J. *Mary Treat.*

Making Maple-sugar: Approved Modern Practice.—II.

OVER natural conditions the sugar-maker has little or no control, while certain artificial conditions are wholly within his power. The quantity and quality of sap vary with location, aspect, altitude and sparseness of growth. The product also varies with the age and vitality of the trees. All these conditions are natural, over which we have no control, except it may be the sparseness. When these conditions are all favorable there is nothing to hinder any one from making first-class syrup and sugar.

We will suppose a sugar-orchard situated on upland, inclined to the south or south-east, having no underbrush or evergreen trees, and the Maples much scattered, full-grown or large second growths, having broad and branching tops and short stems that have never been tapped. As to how and where these trees should be tapped, I would say tap on the warmest side of the tree, or where the sun strikes it the fairest. The height of tapping should be governed by circumstances. As a general rule, the lower we tap the more sap we get and the greater per cent. of sugar.

The sugar-house should be located on sloping land, when convenient, so that sap will run from the drawing-tub into the holder and from that into the evaporator. I have seen several evaporators of diverse patterns, but the one I prefer is made by the Farm Machine Company, Bellows Falls, Vermont. This evaporator, as now built, has a faucet in each end and a water-tight gate, which is a great advantage. It has corrugated partitions, thus nearly doubling its heating surface, and the malate of lime nuisance is overcome.

The evaporator should be set on an arch, well constructed, with fire-box and an ash-pit. A necessary appendage to any evaporator is a regulator, which of itself governs the flow of sap into the evaporator, and relieves the sap slowly or rapidly according to the rapidity of the evaporation. Thus arranged, with store-tubs and drawing-tub metal-lined, we are prepared to gather the sap. It is presumed that the tubs are also of metal, or, if wooden tubs, they should be painted white on both sides to reflect heat and so keep the sap cool, which is of great importance. The colder the sap-season the whiter is the sugar.

Sap should be gathered as fast as it runs. When convenient, gather in the early morning when it is cool. Sap can easily be strained three times: (1) into the drawing-tub, again (2) into the storage-tub, and finally, (3) as it goes from the tub to the evaporator. Care should be taken to set the evaporator level, and the fire can be started as soon as the bottom of the evaporator is covered. The shallower the sap is the faster it can be boiled.

One great advantage in using a corrugated evaporator is that cold sap can be run into one end and syrup drawn from the other end, there being a regular gradation of sweetness from one end of the evaporator to the other, so that the sap is boiled only once, so to speak, that is, without any dilution with fresh sap before it is off and out of the way, thus saving time, wood, color and flavor.

An accurate syrup thermometer is an indispensable necessity for accurate work. This should stand continually in the back end of the evaporator. Sap begins to boil at a temperature of 213 to 215 degrees. When the thermometer indicates 219 degrees the syrup should be drawn off and it will weigh eleven pounds to the gallon. If the syrup is boiled until the thermometer indicates 220 degrees some crystals will be formed in it. If a saccharometer is used it should indicate from thirty-two to thirty-three degrees. If syrup is drawn off at 219 degrees it should stand and settle, and then if the syrup is poured off the sediment will remain in the bottom; but, if the nitre, so called, is not taken out when sugar is wanted, then draw the syrup from the pan before the malic acid and lime combine to form malate of lime. This syrup should not be allowed to cool, but should be made into sugar at once. By taking off the syrup thus early the precipitation to the bottom of the evaporator is measurably prevented. A small pan for sugaring off set near the evaporator, in an arch, is used to finish off into sugar.

In "sugaring off," the smaller the quantity the whiter the sugar. To prevent boiling over use a few drops of sweet cream, which will save stirring and prevent loss of color. With all precautions for cleanliness complied with there will be no need of using eggs or milk to raise a scum. Start the fire slowly and skim without boiling the scum in. The process of sugaring requires thirty minutes, and the cooling should be done by dipping rather than stirring.

To make the whitest sugar possible, fill up a new sheet-iron pan with sap caught early in the season and boil down to sugar without stopping. For this sap bore one-half inch and no more, as the best sap is found in the outer layers of the tree's growth.

To recapitulate, tap low down with a three-eighths of an inch bit; tap shallow, from a half inch to one and a half inches deep; let no sap come in contact with wood; use covers to the sap-tubs, to keep the sap clean and cool; gather in the early part of the day; keep ice in the holders, even if it has to be taken from the ice-house; strain the sap three times; evaporate at once; skim often; keep the sides of the evaporators clean by wiping them frequently with a clean wet cloth; clean the entire evaporator and holders at least twice during the season of boiling.

If nitre adheres to the bottom of the evaporator in the two or three back spaces, clean it off every morning to prevent the coloring of the syrup. This malate of lime is burned on to the bottom, and no syrup can pass over it without being scorched and discolored.

Waterbury Centre, Vt. *Timothy Wheeler.*

Notes on the Forest Flora of Japan.—IX.

THE flora of Japan is rich in Evonymus, there being no less than nine species found within the limits of the empire. Of these the best known in our gardens is the evergreen Evonymus Japonicus, now cultivated in all temperate countries, and its climbing variety usually known as Evonymus radicans. Evonymus Japonicus is a small tree generally distributed at low elevations, and more common in the south than at the north, although it grows naturally in the cold climate of southern Yezo, where, however, it does not attain a large size, and where its presence may be accounted for by the thick covering of snow which protects it in winter. The scandent variety is a hardier plant found carpeting the ground under the forests of Hokkaido, and in the mountain-regions of Hondo climbing high on the trunks of trees, which it encircles with great masses of lustrous foliage borne on stout branches standing out at right angles sometimes to the length of several feet, with leaves which vary from an inch to four or five inches in length and correspondingly in width, and which show the connection of the climbing plant with the arborescent type.

There is a second arborescent Evonymus in Japan, a variety of the widely distributed and variable Evonymus Europæus, to which the name var. Hamiltonianus is given. This handsome plant, with its stout branchlets, large leaves and showy fruit, was introduced from Japan several years ago by the late Thomas Hogg, and it is now well established in the Arnold Arboretum, where it flowers and fruits freely. It is one of the commonest of the Japanese species in all mountain-regions, and grows at least as far north as central Yezo, where it becomes a tree twenty to thirty feet in height.

Evonymus alatus, a variable plant in the development of the wings on the branches, to which it owes its specific name, and in the size of the leaves and fruit, in some of its forms, is also very abundant in the north and on the mountains of central Japan. The wing-branched variety, which is the only deciduous-leaved Evonymus which I saw in Japanese gardens, where it is rather a favorite, is now well known in those of the United States and of Europe, where it is valued for the peculiar pink color the leaves assume in very late autumn. The variety subtriflora, a more northern plant, with slender terete branchlets and small fruit, is, I believe, unknown in gardens. It is one of the commonest shrubs in the mountain-forests of Japan, and on the shores of Lake Chuzenji, in the Nikko Mountains, I saw it rising to the height of fifteen to eighteen feet with slender diverging stems.

In northern Japan there are three other species of Evonymus, all tall shrubs, with large leaves and large showy fruit suspended on long slender stalks, which may be expected to thrive in our climate, and to be decided acquisitions in our shrubberies. Of these Evonymus Nipponicus and E. oxyphyllus produce globose fruit, and E. macropterus more or less broadly winged fruit.

Of Celastrus nothing need here be said of the now well-known C. articulatus, which is one of the commonest plants on the mountains of Japan, except that its leafless branchlets, covered with fruit, are sold in the autumn in great quantities in all Japanese towns, where they are used in house decoration, for which purpose they are admirably suited, as the bright-colored fruit remains on them for many weeks. The second Japanese species, Celastrus flagellaris, I only saw in the Botanic Garden in Tōkyō, where there is a single small plant; it is a common Manchurian species, but appears to be exceedingly rare in Japan. I judge that it has no particular horticultural value.

Half a dozen genera of Rhamnaceæ are included in the flora of Japan, among them Zizyphus, perhaps an introduced plant, often cultivated as a fruit-tree; Berchemia racemosa, a twining shrub with long slender branches, very ornamental during the last weeks of summer, when the half-ripened fruit, which is produced in large terminal clusters, is bright red; two or three species of Rhamnus, of no horticultural value, and the curious tree, Hovenia dulcis, an inhabitant also of China and the Himalaya region, and in Japan often cultivated for the thickened sweetish fruit-stalks, which are edible, although insipid in flavor, and which enjoy among the Japanese a certain reputation for curative properties. Hovenia was first introduced into Europe eighty years ago and is occasionally seen in the gardens of southern France and Italy. In the northern states, where it has probably been tried, it cannot be expected to survive the winter. In general appearance this

tree, which is sometimes thirty or forty feet in height, is not unlike a large-leaved Pear-tree, and as an ornamental plant possesses little value.

In arborescent plants of the family of Sapindaceæ, Japan is richer than eastern America, owing to the multiplication of species of Maple in the former country. Æsculus, on the contrary, which finds its headquarters in North America, where there are five species, appears in Japan in only one—Æsculus turbinata. This, however, is a noble tree—one of the largest and stateliest of all Horse-chestnuts. In the forests of the remote and interior mountain regions of central Hondo, at elevations between 2,000 and 3,000 feet, Horse-chestnuts, eighty to one hundred feet tall, with trunks three or four feet in diameter, are not uncommon. These were perhaps the largest deciduous trees which I saw in the main island growing naturally in the forest, that is, which had not been planted by men, and their escape from destruction was probably due to their

Fig. 24.—Acer Miyabei.—See page 142.

inaccessible position and to the fact that the wood of the Horse-chestnut is not particularly valued by the Japanese. In habit and in the form, venation and coloring of the leaves, the Japanese Horse-chestnut resembles the Horse-chestnut of our gardens, the Grecian Æsculus Hippocastanum, and at first sight might easily be mistaken for that tree, but the thyrsus of flowers of the Japanese species, which is ten or twelve inches long and only two and a half to three inches broad, is more slender; the flowers are smaller, pale yellow, with short, nearly equal petals ciliate on the margins; and the fruit is that of the Pavias, that is, it is smooth and shows no trace of the prickles which distinguish the true Horse-chestnuts. The Japanese Horse-chestnut reaches southern Yezo, finding its most northern home near Mororan, on the shores of Volcano Bay, at the level of the ocean; it is generally distributed through the mountainous parts of the three southern islands, sometimes ascending in the south to an elevation of 4,000 or 5,000 feet. There seems to be no reason why this tree, which has already produced fruit in France, should not flourish in our northern states, where, as well as in Europe, it is still little known. In northern Japan the fruits are exposed for sale in the shops, although they are probably only used as playthings for the children.

To the Maples the forests of Japan owe much of their variety, beauty and interest. Not less than twenty species are known in Japan, while in all of North America there are nine, with six only on the eastern side of the continent. None of the Japanese Maples, however, grow to the size of real timber-trees, or can be compared in massiveness and grandeur with several American species, which are unrivaled in size and beauty by the Maples of any other part of the world.

Some of the Japanese Maples are exceedingly common and form a conspicuous feature of the forest-vegetation, and others are rare and confined to comparatively small areas of distribution. Several of the species I did not see at all, and others in only one or two isolated individuals. The most common of the Japanese Maples, and the largest, is Acer pictum, a handsome small tree, not unlike our Sugar Maple in general appearance; it is one of the most abundant trees in the forests of Hokkaido, where it occasionally attains the height of fifty feet and forms a trunk eighteen inches in diameter. It is a tree of wide and general distribution in Japan, Manchuria, China and northern India, and even in Japan varies remarkably in the size and pubescence of the five to seven-lobed leaves truncate at the base, and in the size and shape of the fruit. This tree must be extremely beautiful when the yellow flowers are just opening in May, for the large, lengthened inner scales of the winter buds are then bright orange color and very showy. The autumn coloring of the leaves I did not see; it is described as yellow and red.

Of more interest to the lovers of novelties is Acer Miyabei (see Fig. 24 on page 143), the latest addition to the list of Japanese Maples. It is a tree thirty to forty feet in height, with a trunk twelve to eighteen inches in diameter covered with pale deeply furrowed bark, spreading branches which form a round-topped handsome head, and stout branchlets orange-brown in their first, and ashy gray in their second season. The leaves are five-lobed by narrow sinuses, with acute entire, irregularly two to three-lobed divisions, cordate or almost truncate at the base, five-ribbed, conspicuously reticulate-veined, puberulous on the ribs and in their axils on the upper surface, and more or less covered with ferrugineous pubescence on the lower, especially on the ribs and veins; they are dark green above, pale below, four or five inches long and broad, and are borne on stout petioles enlarged at the base, two to seven inches in length, and thickly coated while young with pale hairs, which also cover the unfolding leaves. The flowers, which are yellow, are produced on slender pedicels in few-flowered, short-stalked corymbs. The sepals and petals are narrow, obovate, acute and ciliate on the margins; in the male flowers the stamens, composed of filiform filaments and minute ovate anthers, are inserted between the lobes of a conspicuous disk, and are longer than the petals; the pistil is minute and rudimentary; in the fertile flowers the stamens are rudimentary and shorter than the ovary, which is coated with long white hairs. The style, which is described as somewhat shorter than the revolute stigmas, is caducous. The fruit is two inches long, with broad puberulous nutlets diverging at right angles to the stem, and thin, slightly falcate, conspicuously veined wings. This fine tree, which is closely related to the European Acer platanoides, was discovered a few years ago in the province of Hidaka, in Hokkaido, by Professor Kingo Miyabe, the accomplished professor of botany in the college at Sapparo and the author of an important work on the flora of the Kurile Islands, in whose honor it was named in 1888 by Maximowicz.*

On the 18th of September we stopped quite by accident to change cars at the little town of Iwanigawa, a railroad junction in Yezo some forty or fifty miles from Sapparo, and having a few minutes on our hands strolled out of the town to a small grove of trees in the hope that they might prove interesting. In this grove, occupying a piece of low ground on the borders of a small stream, and chiefly composed of Acer pictum, our Japanese guide recognized at a glance a number of fine trees of Acer Miyabei covered with fruit, and surrounding the house of an officer of the imperial Forest Department who had been living for years in entire ignorance of the fact that he was enjoying the shade of one of the rarest trees in Japan. The find was a lucky one, for Iwanigawa is a long way from the station where this species had been discovered, and full-grown fruit had not been seen before; and from these trees I obtained later from Professor Miyabe a supply of ripe seeds large enough to make this Maple common in the gardens of this country and of Europe, in which there is every reason to believe that it will flourish. *C. S. S.*

* *Mél. Biol.*, xii., 725.

Plant Notes.

Cypripedium Rothschildianum.

An illustration of a flowering spike of this distinct and noteworthy plant from the collection of Mr. Hicks Arnold, of this city, is given on page 145. The scape in this specimen is twenty-one inches long, stout as a drawing-pencil, dark and almost black, with a bold, upright position. The petals of the individual flowers extend ten inches from tip to tip and stand out at a right angle from the scape. They are narrow and tapering, of a rich cream or yellow ground and striped and spotted with an Indian-red purple. The dorsal and lower sepals are almost equal in size, each some four and three-quarter inches in length. They are yellow, with dark purple, almost black, stripes, the lower one being somewhat the lighter. The bracts are striped like the dorsal sepal. The lip is striking in form, and its color is a bright Indian-red, beautifully marbled and veined on a lemon ground and shading from light to dark.

It is several years since this plant was imported by Messrs. Sander & Co., from New Guinea, and although it is known as one of the slow-growing varieties, this three-flowered scape shows that the plant is a sturdy one. C. Rothschildianum is one of the thick-leaved varieties, and therefore it needs more warmth than most of the Cypripediums, and Mr. Arnold is to be congratulated on having so vigorous a plant growing side by side with the neat little C. Fairieanum and C. Wallisi. One great merit of C. Rothschildianum is that its individual flowers endure for an unusually long time.

A New Nymphæa.—During the year 1892 quite a list of new Water-lilies was described, but I have seen no notice of Nymphæa gracilis, except an incidental one in a recent letter of Mr. Watson's from Kew. I flowered the plant last summer and am well pleased with it. It resembles the N. stellata type, has leaves about a foot across and flowers six or seven inches in diameter. These flowers are very freely produced.

The petals are white, without any trace of blue or pink and the stamens are a very deep yellow or orange. The flowers have a star-like appearance, owing to the slender or narrow shape of the petals, and they have a peculiar habit of standing twelve or fifteen inches above the surface of the water. N. gracilis is a native of Mexico, and, though not taking rank with the Zanzibar Lilies for beauty, is attractive on account of the novelty of its color in this class. It blooms in the day-time.

Los Angeles, Cal. *E. D. Sturtevant.*

Cultural Department.

Cypripediums.

IT may be safely presumed that Cypripediums are sure to be represented in even the smallest collection of Orchids by one or more of the very many kinds now in existence, and the taste for this easily grown class of plants is rapidly developing, both here and in Europe. There are several reasons why cultivators, once interested, go on from small beginnings to the larger collection of species and hybrids, the principal one being that the flowers last many weeks in perfection without apparent injury to the plants; indeed, it is quite possible to have flowers of Cypripedium insigne lasting, in good condition, from Christmas till Easter. The plants themselves are handsome when not in bloom, even to the casual observer. Of all the known kinds at present in cultivation, there are but very few that can be called poor growers, and it is safe to say that Cypripediums are the safest of all Orchids as an investment for beginners. There is no difficulty in meeting their demands, chief of which is a plentiful supply of water, as they need no season of rest, but should be kept moist at the roots continually. But, perhaps, the greatest incentive to the culture of Cypripediums is the ease with which seedlings can be raised and flowered. Some of the best work in this field has been done by amateurs, and one often finds promising lots of young seedlings coming on in the hands of both professional and amateur growers.

Newly imported plants of this family establish themselves rapidly from nice plants. A single growth of C. Chamberlainianum obtained last June has, since that time, become established, and produces four promising young growths. A lot of C. insigne, obtained as imported plants in the fall of 1891, are now fine plants in six-inch pots, and will flower freely next winter; many were strong enough to flower last winter, but as we desired to obtain strong plants they were kept in a warm house and they did not stop to flower, but kept on growing all the time. Many Orchids, when newly imported from their native country, are best kept out of pots until they show signs of life and begin to root, but Cypripediums are best when potted up at once, as they start quicker and the foliage begins to freshen up from this time forward, while if the plants have but few live roots they may be placed in pots with small pieces of broken pots to keep them in position until they begin to make roots, when a little Fern-root and moss may be placed in the pots over the crocks.

If plants at any time become unhealthy they may be taken out of the old soil and the roots and leaves thoroughly cleansed with tepid water. The live portions should be placed in crocks like newly imported plants and kept moist by frequent syringing, and in this way they may be speedily brought round to a healthy growing condition. It is quite possible to repot Cypripediums at any season if care is taken not to mutilate the

Fig. 25.—Cypripedium Rothschildianum (reduced).—See page 144.

roots, but it is preferable to do this as they are about to start into growth with the returning warmth and sunshine of spring. Ours have all been taken in hand and either repotted or the surface of the material carefully removed and replaced by fresh moss and Fern-root in about equal portions. Many advocate the use of loam in the material for some of the more robust-growing sorts, such as C. insigne, but we have always succeeded well without it. Others again recommend the use of moss alone mixed with broken pots, but with the capacity of moss to retain water very careful attention is necessary to avoid over-watering. We recently received plants that were potted in moss alone, and their condition was anything but desirable; they have all been repotted in Fern-root and moss. Sphagnum, even the best, has a tendency to decay rapidly, and when used in any quantity it soon decomposes, and, therefore, should not be used near the roots, but rather on the surface, where it will speedily grow and become green, making an excellent reminder when water is needed. The "Fern-root" named is that of the several Osmundas, common in the United States, preference being given to those growing in well-drained soil. Two distinct grades of fibre can be obtained from the same mass; the more recently formed will be brown and spongy and is excellent for the thick roots of Cypripedes to run through, while the older and wiry portions will suit Cattleyas equally well. It used to be the rule to elevate the plants above the top of the pot when repotting, but this renders the operation a little more difficult, and is altogether unnecessary, as the plants succeed equally well, and in some cases better, when placed in the pots as other plants are.

There are few Orchids that are so easy to satisfy as to other conditions. Most Cypripediums will thrive admirably in a temperature of fifty-five degrees at night, and some will stand a much lower temperature, while, again, others need more warmth, these being such as come from the islands of the Malay Archipelago and their offspring. But a house that can be maintained at sixty degrees at night in winter, with a corresponding rise by day, will suit those that come from those warmer countries. Those kinds that have tessellated foliage need shade from bright sunshine at all times, or the leaves will lose much of their healthy green coloring, and this means loss of vigor, as Cypripediums, being devoid of bulbs, do not store up vigor. The green-leaved kinds will stand much more sunshine, though from this time forward shading is desirable for them also.

The taste for Cypripediums in most cases appears to be the result of education; few take to them at first as they do to the more showy genera of Orchids, but all are almost sure to acquire a growing appreciation of their refinement and elegance as time goes on. A careful selection of a dozen kinds would give flowers every day in the year and a pleasing array of foliage always. The hybridist has done much to improve and refine the quality of these plants, and if I were to select a limited number of the best kinds the majority would be of garden origin. Great advancement is possible in this direction, and proofs of this are constantly visible. The introduction of a single species new to science makes possible innumerable combinations out of which much progress is sure to be made. Rigid selection must begin very soon, or what will be the condition of the nomenclature of Cypripediums a few years hence?

South Lancaster, Mass. *O. O.*

The Persian Cyclamen.—II.

WITH regard to cultural requirements, the Cyclamen is now much better understood than at any time since its introduction. Formerly it was the custom to grow only a few corms, preserving the same plants until they died of sheer exhaustion. These old corms, grown year after year, were given a severe rest during the summer months. They were, indeed, pretty thoroughly ripened by exposure to the sun, and then, early in autumn, were potted and placed in a greenhouse temperature. The corms treated in this way were often, though not invariably, unsatisfactory. Some excellent gardeners still pursue this method, and in good hands it is not unusual for a corm thirty years of age to yield as many as 500 flowers in a single season.

Usually, however, the younger generation prefer more reliable, if smaller, plants, each bearing about 200 flowers, especially when these can be had, by the modern system of cultivation, in about eighteen months from the time the seeds are sown. The seed ripens about the latter part of June or early in July, and should be sown in August in shallow pans and light sandy soil. The pans should then be placed in a propagating-frame, where, with the proper watering and shading, the seedlings are fit to prick off in October or November. A moist atmosphere and intermediate temperature are now most beneficial to the plants, and they should be placed moderately close to the glass, at all stages of their growth a desirable position. If well grown they can be placed singly in small pots in February, with the corms entirely covered. Later on they should be placed in four-inch pots, and the last shift into five-inch pots should be made early in May.

The best soil for Cyclamens, from the first potting onward, is composed of equal parts of light loam and leaf-mold, with the addition of well-decomposed cow-manure and sand in small proportion. The plants should be stood in a cold frame, with a solid, moisture-holding floor of coal-ashes or similar material throughout the summer months, and they will then require careful attention. Watering, shading and airing will not admit of neglect, if plants of the highest quality are desired, and in bright weather they should be lightly sprinkled overhead two or three times daily. They may be again transferred to the greenhouse early in autumn, and it will be all the better if the atmosphere is kept rather more dry than when they formerly occupied the same quarters. The application of some stimulating fertilizer is beneficial while they are blooming. The only insect which troubles the Cyclamen to any serious extent is the green-fly, and this is easily held in check by fumigating with tobacco.

Whether individual plants should be retained or discarded depends upon their quality. Good varieties should certainly be preserved, but such plants will require treatment somewhat different from that of younger plants. Less moisture will suffice during the cold-frame period, though the soil should never be allowed to reach a state of thorough dryness, and the corms should be repotted only in autumn. They may, with these cultural modifications, prove even more valuable than seedlings; and to employ them as seed-bearers to the moderate extent indicated in the first article, will not affect their value as flowering plants. Cross-fertilization is best performed in March and April. The weather is then clear and bright, and the sun has gained sufficient power to impart a free-working condition to the pollen. There is, moreover, the greatest variety of plants in bloom at this time, affording operators the wildest possible range of selection. But it is useless to embark on this work without some definite aim at improvement, for good seed may be had in abundance, quite independent of artificial intervention, other than that entailed in the removal of superfluous seed-pods.

Cambridge, Mass. *M. Barker.*

Sowing Seeds of Annual Plants.—II.

WHILE Sunflowers will do well enough sown in the open, nothing is lost by having them early. The Texan silver-leaved and the miniature Sunflower (Helianthus cucumerifolius) are among the handsomest and best for any purpose. In noting plants for cutting it is hard to omit the common Helichrysum, always a favorite with children. The common annual Larkspurs are constantly in bloom, and their long spikes in various shades of blue, pink and white flowers, single and double, help to make a pleasing variety. When once established in a garden they may be relied upon to take care of themselves, coming year after year.

Mignonette is another useful plant. It should not be raised in a hot-bed, but sown where it is required to bloom, as it is very hard to transplant. Poppies are becoming popular, and worthily so; they are among the easiest plants to grow. Generally the annual kinds do well, and bloom early enough if sown in the open border in May. As they do not transplant easily it is better to sow a few in pots, and plant them out with a ball of earth. The Munstead varieties of the Iceland Poppies are beautiful. Daneborg has flowers in the form of a Maltese cross, scarlet, with the base of each petal white. Papaver umbrosum, a selected variety of P. Rhæas, is very handsome, the flowers a brilliant crimson, with black at the base of each petal. The Shirley Poppies are, of course, indispensable.

Sweet Peas, during the past few years, have increased in beauty and variety. There are now many well-defined varieties which come tolerably true, and each year brings its share of novelties. Some of the best varieties are Apple Blossom, Boreatton, Countess of Radnor, Emily Eckford, Firefly, Mrs. Sankey and Miss Hunt. The buyer of new varieties will probably find not more than twenty-five seeds in some of the packets. With these special kinds I would advise a plan which I shall try, and which a friend has successfully followed for a number of years. This is to sow Sweet Peas by drills in the hot-bed and pot them off singly in three-inch pots. When established, as they will be in a few days, they should be planted out six inches apart in a double row. When given plenty of room these plants "stool" surprisingly and produce

very large flowers. Sweet Peas require abundance of water during the dry season and ought to be closely picked; all seed-pods, especially, being picked off, to keep them continually in bloom.

Varieties of Sweet Scabious are among the most useful border plants grown, and are universal favorites. They are rather tall and should have at least one foot of space; the flowers are aster-like, on long stems, varying in color, from white to the deepest crimson. Ten-weeks Stocks for bedding and cutting are indispensable. Dwarf Bouquet are the best for bedding; for cutting, the large-flowered pyramidal are to be preferred. Stocks had better be transplanted when small into boxes or pots, from which they are more easily shifted into blooming quarters; if left in the seed-bed, crowded, until large, they are established only with great difficulty.

The Chinese Aster, a beautiful summer and autumn flower, repays good culture. The first sowings should be pricked off as recommended for Stocks; subsequent ones may be made thinly where the plants are intended to bloom. The Comet strain, now in five or six colors, including white, I consider the best for all purposes. It is comparatively dwarf in habit, very early, and bears an immense number of loose flowers, after the form of a Japanese Chrysanthemum. It is superior to the Pæony-flowered and the Victoria, being of loose construction, and does not suffer nearly so much from heavy rains. The Pompone, Quilled and Dwarf Bouquet are general favorites.

Wellesley, Mass. *T. D. H.*

The Forest.

Notes on the Climatic Influence of Forests.

WHILE writers on forestry and friends of the forestry movement have been advocating reform in the public treatment of forests on the ground of their conjectured climatic importance, a thorough investigation of the question by scientific methods and careful systematic measurements has been made in Europe, where well-established forest-administrations rendered possible such work on an extensive scale—such a scale as is necessary for conclusive results.

The question of practical importance is not so much as to the effects of the forest upon the general climate, but as to the local modification of climatic conditions produced thereby. We are not concerned as to whether the total rainfall over the continent is increased, but whether the distribution of precipitation in time and quantity over and near a forest-area is influenced by its existence; whether we or our crops feel its absence or presence in our immediate neighborhood.

We can readily understand that an effect upon climate, if any, must be due, in the first place, to the mechanical obstruction which the forest-cover presents to the passage of air currents and to the action of the sun's rays upon the soil; that it must result from a difference in insolation and consequent differences in temperature and evaporation over forest and field; and that this influence can become appreciable only when large enough air columns of different characters are opposed to each other, capable of producing local currents of air which may intercommunicate the characteristics of one area to the other, or else of changing the character of passing air currents. The size and character of the forest-growth, its density, height, situation and composition are much more important in determining its influence than has been hitherto supposed. It is not trees, but masses of foliage, which may be effective.

The most important contributions toward a solution of the question of climatic forest-influences are the observations at three sets of forest-meteorological stations, established in Switzerland, Germany and Austria. The systems, made up of double stations, one within, the other without, the forest, but under similar conditions otherwise, cannot finally decide the question of the climatic influence of the forest, but they may furnish preliminary data, in establishing the differences between meteorological conditions in the forest and in the open, from which finally the reaction of one upon the other may be deduced with the aid of additional observations in radial stations, such as have been more recently established in Austria.

The observations in the forest-meteorological stations of the Canton Berne, lately published, comprise nineteen years at three sets of stations, the longest systematic series of observations so far recorded. Only the temperature observations of air, soil and tree-interior are so far published, with results which permit of the following conclusions: The air temperatures taken three metres above ground are found in the forest lower for mean annual as well as mean monthly, except during winter months. The difference is greater at 4 P. M. (time of daily maximum) than at 9 A. M., and increases as the season temperature increases, reaching its maximum in July, then decreasing toward fall; in winter the air temperature in the woods is nearly the same as in the open, or, at least, only slightly warmer. The evergreen forest seems to exert greater cooling influence than the Beech-woods. Altogether, the range of temperatures through the year is from two and a half to three degrees, Fahrenheit, greater in the open.

The soil-surface in the open in summer is warmer, in winter colder than the air; in the forest, on the contrary, the surface temperature is always lower than the air temperature, and the forest-soil shows at all depths during spring, summer and autumn lower temperatures, but in winter either the same or slightly warmer than the open. The greatest difference is found at the surface, the Spruce-forest at Berne exhibiting the greatest cooling effect to the extent of nine degrees, Fahrenheit, while the warming effect in winter ranges only from one to two degrees.

At 9 A. M. no difference was found between temperatures breast-high and in the crown of the trees, but at 4 o'clock the crown shows higher temperature, except in winter, when it is as cold as, or colder than, the lower parts. The trees are always colder than the surrounding air and colder than the air in the open, especially in summer. This may be one of the factors which help to cool the air temperature in the forest and possibly induce condensation of moisture-laden air currents. The range of tree temperatures is smaller than that of air temperatures.

From the observations at the German stations, sixteen in number, which extend through now eighteen years, the most interesting result regarding forest-influence upon rainfall may be cited at the station of Lintzel. This station is situated in the great Lueneburg heath, a prairie-like country, which, during the existence of the stations, has been reforested, so that on an area of twenty-five square miles the following change took place:

	Before reforestation.	After reforestation.
Field and meadow,	12 per cent.	10 per cent.
Heath,	85 " "	10 " "
Forest,	3 " " (old)	80 " "

The reforestation took place at the rate of 1,000 to 1,500 acres a year at first, afterward more slowly, until 8,000 acres were under forest.

Comparing the rainfall observations with those from stations outside of the forest-conditions, but near enough to be available for comparison, the following changes took place at Lintzel. While at first the rainfall was only about eighty per cent. of that at the other stations, it increased as follows:

1882.	1883.	1884.	1885.	1886.	1887.	1888.
81.3	86.3	95.2	99.8	100.6	103.7	103.9

So that finally it rose from a deficiency of nearly twenty per cent. to an excess of nearly four per cent.

The observations at the Austrian stations cover a period of eight years. These stations, of which there are three sets, are radial, that is to say, there are several sets of instruments in the open at varying distances and in different directions from the forest, by which arrangement, it is to be hoped, not only the difference of meteorological conditions, but also the influence, if any, of forest-areas, may be determined. These observations are especially valuable, because they have been taken at various heights above the soil, and, therefore, indicate the differences in vertical distribution of these meteorological factors of temperature and moisture. Comparing the air temperatures of forest and field at the same height above the soil, namely at sixteen, thirty-six and forty-eight feet, we find in the day-time the same temperature, lower below, higher above the crowns than at corresponding heights in the open, while in the night the temperature in and above the crowns is lower. Yet the differences are not very great.

The absolute humidity is always greater in and above the forest. This excess is smallest toward morning and reaches its maximum at noon, then decreases again. The difference at noon is 0.55–0.63 inches, with calm air. The relative humidity at all heights and at all times is higher in the forest, the difference in calm weather at sixteen feet reaching as high as thirteen to thirteen and a half per cent. in the mean of observations. At forty-eight feet it is less, yet in the hours toward morning it is still ten and nine-tenths per cent. greater than over the open. In regard to the humidity of the air, it is noteworthy that in the forest the relative humidity increases and decreases at the same time with the absolute humidity, while usually in the field they have opposite progressions. This leads to the conclusion that the forest is at the same time a source of atmospheric water-supply and of cooling. Since in

the open, the water-supplies, under the influence of higher temperatures and unchecked winds, are more readily exhausted or reduced to a minimum where evaporation and transpiration of the soil covering plants does not increase proportional to temperature increase, it becomes evident that the forest retains for a longer time a water-supply which is easily available.

The observation that both absolute and relative humidity are increased in the forest is a new and important fact, which had not been apparent from the observations of the German stations situated under the influence of an oceanic (the Baltic and Atlantic) climate, which is characterized by high relative humidity and only occasional high temperatures, while the Austrian stations are situated near the region of the pontic dry climate. In such a climate the dry air is capable of taking up additional water-supplies from the forest, and since the latter has also a cooling effect, both absolute and relative humidity of air currents passing it are increased, while in the oceanic climate the absolute moisture, already high, cannot be increased, and only the cooling effect of the forest affects the relative humidity. This important difference in general climatic conditions must be kept in view when discussing forest-influences. In comparing forest and open field, the kind of cover of the latter must also be taken into account. During the early development of meadow-growth and of crops, while they are green, they furnish by transpiration more water to the air than the forest. Since, therefore, during this season the open soil loses both by evaporation and transpiration more water than the shaded forest-soil, the latter is able to supply moisture when that of the field-soil is exhausted and begins to absorb moisture from the atmosphere, especially when, with the ripening of the crops, the plants cease to transpire much water. Hence, the difference of absolute humidity appears greater in the forest, especially in dry seasons.

The decrease in absolute humidity above the forest-crown must, of course, take place at about the same ratio as above the field, but altogether the observations seem to show that the enriching of the air with moisture above a forest-cover can extend to a considerable height. These conditions of moisture and temperature above the forest lend countenance to the claim that the possibility of precipitation over large and dense forest-areas is greater than over open fields.

As far as the temperature and moisture conditions of forest-areas may be communicated to adjoining fields, further light is promised from the radial stations in Austria. The results from these have only just been published, and I will refer to them at some other time. Theoretically, there are various objections to the assumption that the influence, if any, is an appreciable one. But we know that meteorological theories, more than others, are liable to be at fault and unsatisfactory in many respects, probably on account not only of the complicated nature of the phenomena with which they deal, but also of the defects in methods and means by which the data have so far been collected.

It is hardly a conclusion, but at least an impression, that seems to come from looking at results already presented that, as a climatic factor, the forest of the plain is apparently of more importance than the mountain forest, the more potent meteorological influences of the mountain elevation obscuring and reducing in significance the influence of their cover, while for soil and water conditions the mountain forest is of considerable importance.

Washington, D. C. *B. E. Fernow.*

Correspondence.

On the Local Segregation of Trees.

To the Editor of Garden and Forest:

Sir,—In the first of Professor Sargent's highly interesting and instructive papers on the Forest Flora of Japan, he tells us that "the segregation of arborescent species in Japan . . . is the most striking feature of the silva of that country"; and he says that in Yezo are "probably more species of trees growing naturally in a small area than in any other one place outside the tropics"; in support of which statement he gives a list of forty-six species and varieties (forty-three species and three varieties) which he noticed "in ascending a hill which rises only 500 feet above the level of the ocean." To these he adds thirteen species "growing within five miles of this hill," making "in all sixty-two species and varieties, or more than a quarter of all the trees of the empire crowded into an area only a few miles square."

Unless the list given by Professor Sargent is a very incomplete one, I think it can be proved that at least one locality in the eastern United States is even richer than Yezo in respect to the number of species of trees growing in a restricted area. In the *Proceedings of the United States National Museum* for 1882 (vol. v.) I published lists of trees found by me growing in limited areas of forest in south-eastern Illinois and south-western Indiana, which I reproduce here, although, to save space, they are presented in a different form, names of the species being omitted, and a summary of the number of species and genera found on each tract, with the size of the tract, being substituted. For convenience, the tracts are designated as "a" and "b."

Tract.	Locality.	Area of tract.	Number of genera.	Number of species.
a.	Wabash County, Illinois,	50 acres.	24	46
b.	Knox County, Indiana, .	75 "	29	52

Both these tracts were absolutely level ground, the first varied only by a creek which meandered through it, and the second bordered by a wooded swamp along one edge. Within half a mile of locality "a" there were identified twelve additional species and five additional genera; while within three miles in a nearly opposite direction were found seventeen additional species and five additional genera, making a total of seventy-five species and thirty-six genera—against sixty-two species and thirty-two genera of the Japanese list—growing on very much less than five square miles of territory.*

In locality "b" an enumeration of the species of trees growing on a separately enclosed tract of only twenty-two acres in extent, about eight acres of which had been partially cleared, showed forty-four species, belonging to twenty-five genera, to be growing there, or two species and more than one genus for each separate acre of ground. I am quite certain that the two localities referred to are by no means exceptionally rich in the number of species for that region; in fact, I am sure that five-mile-square areas might be selected in the valley of the lower Wabash which would produce a still larger number of species and genera; but it would be necessary to include within their limits a greater variety of surface—that is, to include not only the usual bottom-land forest, but also swampy tracts, river-banks and a portion of the river-bluffs.

In his second article on the forests of Japan, Professor Sargent calls attention to the great difference in the undergrowth which covers the ground beneath the forests in the two regions, which he says is so great that it "must at once attract the attention of the most careless observer." This undergrowth, he says, in America is composed of a great number of shrubs, while "in Japan the forest-floor is covered . . . with a continuous, almost impenetrable, mass of dwarf Bamboos of several species." Now, this latter character of undergrowth is exactly what is found in parts of the Mississippi valley, except that only one or two species of arborescent grass, instead of several, constitute the nearly impenetrable undergrowth. Large areas of forest in southern Indiana and Illinois (though farther northward† in the former than in the latter state) have the ground chiefly occupied (where not destroyed by horses and cattle) with a very dense growth of the "Switch-cane" (Arundinaria tecta), growing, as do the Bamboos of Japan, from three to six, though sometimes ten or more, feet high; and the parallelism is carried still farther by another feature mentioned by Professor Sargent in connection with Japanese forests, these very forests of southern Indiana and Illinois being "filled with climbing shrubs, which flourish with tropical luxuriance"; though many of the genera are different, our forests having, of the larger or higher growing vines, representatives of the genera Vitis (five species), Cissus, Ampelopsis, Wistaria, Celastrus, Calycocarpum, Rhus, Bignonia, Tecoma and Aristolochia, most of which ascend to the tops of the tallest trees, frequently more than 100 feet from the ground, and the largest stems of Vitis, Tecoma and Rhus sometimes measuring a foot in diameter.

With all these elements of similarity, however, there are equally marked points of difference between the forests of Japan and those of the region under consideration. Most conspicuous is the absence of evergreens in the latter, there being among the seventy-five species representing the silva of the southern Illinois-Indiana area described above not a single evergreen tree. In fact, the general absence of evergreens, both among trees and shrubs, is a conspicuous feature of these

*The genera represented were as follows: Liriodendron, Asimina, Tilia (two species), Æsculus, Acer (three species), Negundo, Gleditsia (two species), Gymnocladus, Cercis, Prunus (two species), Pyrus (two species), Crataegus (four species), Amelanchier, Rhus, Liquidambar, Nyssa, Cornus, Viburnum, Diospyros, Fraxinus (five species), Sassafras, Catalpa, Ulmus (three species), Celtis (two species), Morus, Platanus, Juglans (two species), Carya (seven species), Quercus (thirteen species), Fagus, Carpinus, Ostrya, Betula (two species), Salix (two species), Populus (three species) and Taxodium.

†To a distance of several miles above the mouth of the White River.

forests in winter, the only woody plants which preserve their verdure from November to April being the forest Reed or Bamboo (Arundinaria), the Cross-vine (Bignonia capreolata), the Mistletoe (Phoradendron flavescens) and two or three species of Smilax. The almost complete absence of coniferous trees is the next most conspicuous characteristic, there being only one species, and that a deciduous one (Taxodium distichum).

Washington, D. C. *Robert Ridgway.*

[In writing of the difference in the character of the undergrowth in American and Japanese forests, I had in mind New England and the Alleghany country, that is, the regions which most nearly correspond with Yezo and the central mountain chain of Hondo, and not the alluvial Mississippi plain, which finds no counterpart in Japan.—*C. S. S.*]

Why Varieties of Orchard-fruits Disappear.

To the Editor of Garden and Forest:

Sir,—I have read with much interest Professor Bailey's paper entitled "Are the Varieties of Orchard-fruits Running Out?" His argument, drawn from lists of desirable varieties published early in the century and at present, is certainly strong in the line that disappearance is not due to the decay of the variety as such, but to its lack of adaptation to the conditions and environment. Professor Bailey seems to consider only natural conditions as factors.

If California nurserymen's lists of forty years ago, which was at the beginning of things out here, were compared with lists now current, there would appear a vast change. The percentage of old varieties retained would be smaller than in the contrasts which he cites between the new and the old on the Atlantic coast. Both European and eastern sorts of fruits, notably Peaches and Apricots, have been displaced by California seedlings. This exchange is unquestionably due to the fact that the varieties which are now listed, both those of distant and local origin, are better suited to the local environment, but this only partially explains the rejection of the old and the choice of the new varieties. Another strong force in preserving some old varieties rather than others, and in the popularity of certain new varieties of local origin, is found in their commercial as well as natural adaptations. Possibly this is a stronger consideration here than at the east; with us it undoubtedly has more to do with choice of varieties than any other. We are selecting varieties which endure shipment over long distances or varieties with certain characteristics for canners' use or with certain others for drying. Planters have these special requirements in mind, and select for one or several of them. This leads to the rejection of many varieties which succeed so far as natural conditions go, but which do not meet commercial considerations. In California, surely, the disappearance of a variety from public view does not necessarily indicate its decadence. I should like to see Professor Bailey's estimate of this force in connection with the disappearance of varieties at the east.

Berkeley, Calif. *E. J. Wickson.*

Salix balsamifera.

To the Editor of Garden and Forest:

Sir,—To the discussion of the geographical distribution and frequency of this rare and beautiful Willow, in recent numbers of your journal, permit me to add that I chanced to find a clump of Salix balsamifera in Keweenaw County, Michigan, early in June, 1888. The specimen was a low, spreading male shrub, and its flowering season was nearly over. As the home of S. balsamifera is in low, wet, swampy ground on banks of small streams, or in copses of Alder, Birch and Maple, it attains its best growth here, where the soil is rich moist earth covered with leaf-mold. It often assumes the character and habit of a tree, reaching a height of twenty-five feet, and a girth, two inches from the ground of from three to ten inches. But it assumes its most beautiful aspect, and is more frequent, in the open, swampy grounds, where it is exposed to the sun on all sides. Under these conditions it forms large broad clumps, and rarely exceeds three feet in height. When in flower it is the most beautiful of all Willows.

Some two or three years ago Mr. Bebb informed me that S. balsamifera appeared to take the place of S. cordata along our northern borders, the two plants never having been reported to him from the same locality. I do not know whether botanical collectors since then have found these two Willows together, but it is certain that S. cordata is not found in Keweenaw County, where S. balsamifera is not uncommon. S. balsamifera was also found at Flint by the late Dr. D. Clark, but the station, I believe, has since been destroyed.

Detroit, Mich. *O. A. Farwell.*

Exhibitions.

The Boston Flower Show.

THE annual spring exhibition of the Massachusetts Horticultural Society, which was held in Boston last week, although smaller than usual, perhaps, in the number of plants exhibited, was one of the most interesting which have been seen in Boston for several years. The feature of the exhibition, from the cultural point of view, was a collection of Persian Cyclamens, staged by Mr. Kenneth Finlayson, the gardener of Dr. C. G. Weld, of Brookline. The plants were admirably grown and covered with long leaves and beautifully colored flowers; they deservedly received the first prize. A collection of these plants staged by G. M. Anderson was noticeable for the size of the flowers, which surpassed, in this respect, those in Dr. Weld's collection.

Of forced hardy bulbs the Hyacinths were remarkably fine, especially those shown by Dr. Weld, who carried off the principal prizes; by Mr. N. T. Kidder, the president of the society, and by Mr. John L. Gardiner. Dr. Weld's collection was especially strong in such standard sorts as La Grandesse, Lord Macaulay, King of the Blues, Von Schiller and Sir Henry Berkeley. Tulips, Narcissi, and other plants of this class which usually appear at flower shows at this season of the year, were not abundant, and while a few were good, they were not, as a rule, of high quality.

The exhibition of a number of well-grown plants of Acacia indicates, it is to be hoped, that these beautiful and useful winter-flowering plants are regaining their popularity in northern greenhouses. The species shown were Acacia pubescens, one of the most graceful and beautiful of all winter-flowering shrubs; Acacia Drummondii and Acacia cultriformis, the last rather a difficult plant to manage; and it is unusual to find it under glass in as good condition and as well flowered as the specimen exhibited by Dr. Weld.

Mention should be made of a collection of hardy shrubs forced into bloom at the Bussey Institution, especially of some well-flowered plants of Andromeda speciosa, the most beautiful of all our native species, with large, waxy white, abundant flowers. This, apparently, is one of the best shrubs for the winter decoration of conservatories.

The plants of Indian Azaleas were not very numerous or striking. Mr. Kidder, the president of the society, obtained the principal prizes for them. Orchids were represented by good specimens from E. W. Gilmore and N. T. Kidder, an interesting novelty from Pitcher & Manda, of Short Hills, New Jersey, in Cypripedium Greyanum unicolor. Siebrecht & Wadley, of this city, besides some good Orchids, exhibited a remarkable new pink hybrid Tea Rose of exceptional beauty, and one of the most promising of its class which has lately come under our notice. It was unnamed, and is said to be a seedling of La France. It received honorable mention at the hands of the committee, as did John N. May's new hybrid Tea Rose, Mrs. W. C. Whitney. Joseph Tailby & Sons received a certificate of merit for a seedling self-yellow Carnation named Henrietta Sargent, which was exhibited the week before in Philadelphia and attracted much attention on account of its pure color.

There was, perhaps, nothing more beautiful in the hall than a vase of seventeen varieties of Carnations shown by R. T. Lombard, and one of Sweet Peas sent by Harry S. Rand. Francis B. Hayes received a silver medal for a dwarf Japanese plant of Cycas revoluta, recently brought from that country by his gardener, James Comley. The plant, which is a fair specimen of Japanese dwarfing, is about eighteen inches high. It was claimed by the exhibitor to be one hundred and twenty-five years old and to have been grown in the pot in which it was shown for fifty years, and to be worth $500. Persons interested in such oddities ought to be informed, perhaps, that still more distorted and more expensive plants than this can be obtained in Japan.

Among other exhibits, mention should be made of the Cinerarias grown by Mr. C. M. Atkinson, gardener to John L. Gardiner, Esq.; the general collection of bulbous plants from Wm. Elwell & Son; and seedlings of Primula Sieboldii by Rea Brothers. Besides the exhibitors mentioned above, prizes were awarded to Mrs. Mary T. Goddard for Cyclamens; Wm.

Patterson, gardener to Mrs. C. F. Adams, for Polyanthus and greenhouse plants; J. Newman & Son for Roses; Martin H. Cumming, A. H. Fewkes & Son and George B. Gill for seedling Carnations.

Notes.

Mr. Frederick Vernon Coville, one of the staff of the botanical department of the Department of Agriculture of the United States, and recently associated with Mr. E. Hart Merriam's Death Valley Expedition, has been appointed chief of the botanical division of the department, in place of the late Dr. George Vasey.

Professor Bailey has tried various preparations of paper and cloth as substitutes for glass in greenhouse roofs, but paper is so easily torn and punctured that it is nearly useless, and the cloth, even if it would last for two or three years, would soon become darkened by dirt and mildew, so that in the end glass roofs are not only better but cheaper.

Professor A. S. Hitchcock contributes to the *Transactions of the Academy of Science*, of St. Louis, an interesting paper on the opening of the buds of some woody plants, illustrated by a large number of figures showing the development of the buds, the folding of the leaves, the appearance of the young stipules, etc., in a number of native trees and shrubs, characters which have heretofore been too much neglected by the students of American trees.

Quoting recent accounts of the great development of the culture of aquatic plants in America, the *Illustrirte Gartenzeitung*, of Vienna, strongly recommends its readers to follow our example, and says that the fact that the various species of Nymphæas and Nelumbiums would flourish in some parts of Austria is proved by the excellent condition of the plants of Victoria regias in the royal gardens at Schonbrünn, where, last autumn, the flowers were still unfolding at the beginning of November.

With regard to poisonous plants, Professor Brooks says: "It will possibly surprise many to learn that there are thirty-nine species of poisonous plants in the United States, either indigenous or naturalized, all of which are mentioned in a recent work on medicinal plants, as now or formerly considered valuable in the treatment of disease. Yet in descriptions of patent medicines we read that 'it is entirely harmless, as it contains only vegetable substances.' It should be known that many of the most virulent poisons are of vegetable origin. Morphine, strychnine, aconite and prussic acid may be cited as examples of vegetable poisons."

The first Havana watermelons are now offered in the New York fruit-stores at two dollars each, and West India mangoes are a dollar a dozen. Florida strawberries are more plentiful and improved in quality, notwithstanding the effect of recent heavy rains; the best sell for seventy-five cents a quart. The season for southern oranges is on the wane, the best Florida navel oranges selling for a dollar and a half a dozen, and the California fruit, which is later, at a dollar a dozen. The first new Bermuda potatoes received last week sold readily at ten dollars a barrel. Butter-beans brought as much as thirty-five cents a quart, and new Florida celery two dollars a dozen stalks. New southern cabbage and new Havana onions are two dollars and a half a crate.

Peach-trees, from their peculiar habit, need some pruning every spring, and a writer in *The Country Gentleman* gives the following general directions: The tree should be kept in a compact shape, that is, the limbs should not be allowed to run out into long poles, with tufts of leaves at the ends. The one-year-old shoots should he cut back one-half or more of their length, and, if pruning has been neglected for two or three years, limbs nearly an inch in diameter may be cut off at the base. Trees thus treated will be longer-lived and will bear better fruit. A good way to prevent overbearing, which not only gives poor fruit, but injures the tree, is to thin out every alternate shoot which has a surplus of blossom-buds. Peach-trees bear heavy pruning better than most other trees, and they naturally recover soon from the operation.

A new Rose, for which Mr. Jackson Dawson lately received a silver medal from the Massachusetts Horticultural Society, is a seedling of 1889. Its seed parent was Rosa rugosa, and this was fertilized with the pollen of General Jacqueminot. The plant is of medium growth, perhaps hardly so robust as R. rugosa, but rather more so than the pollen parent, and it bears freely flowers nearly as large as those of R. rugosa, single, and clustered after the manner of that plant. The color of the flowers is a brilliant crimson which does not fade, but keeps bright until the flower closes. The plant flowered for the first time in 1891. The next year Mr. Dawson received a first-class certificate for some cut blooms of it. This year he exhibited a plant which won the medal. Mr. Dawson has named it Arnold, in honor of the founder of the Arboretum with which he has been so long connected.

At a recent meeting of the Massachusetts Horticultural Society, Mr. L. W. Goodell, of Dwight, said the seeds of Nymphæas should be sown in small pots in February or March, in good soil, well pressed down. The seeds should be placed on the surface and covered with an eighth of an inch of sand. The pots should then be immersed in a pan containing water enough to cover them an inch, and the water kept at a temperature of from seventy-five to eighty degrees until the seeds germinate, a period varying from six to ten days. Before the seedlings become crowded they should be transplanted into three-inch pots, and again into four-inch pots before planting out in June. The starting of seedlings can be done in the dwelling-house, care being taken to maintain the temperature and to move the plants to a sunny window during the warm hours of the day. The young plants grow rapidly under proper conditions, and they will bloom in one hundred days from the time the seeds are sown. Some seedlings of N. Zanzibarensis have flowered in sixty-five days, from seeds started in June.

The Tree-planting and Fountain Society of Brooklyn, under the leadership of the president, Mr. A. Augustus Low, is actively engaged in arousing intelligent interest in the planting and care of street-trees in that city. Articles containing practical suggestions on the subject are being published in the daily press, and a set of circulars for general distribution is in preparation. These will give lists of the best street-trees and the most approved methods of planting and caring for them. Neighborhood clubs have been formed, comprised of property-owners interested in improving their neighborhoods, and arrangements made with reliable nurserymen to furnish well-grown trees, shrubs and vines for the use of the society and for sale to citizens. A list of competent pruners in various sections of the city is kept on file in the rooms of the society, 44 Court Street, where the secretary, Mr. L. Collins, is in attendance every afternoon to give information and advice. The annual fund of $500, provided by the late president, Mr. Samuel B. Duryea, will be used in improving and beautifying different sections of the city.

The various species of Solidago, although many of them are quite distinct from the botanist's standpoint, have never received distinguishing popular names, but are all included under the general name of Golden Rod. In Professor Halsted's Check List of American Weeds, ten species are included, although the genus as a whole does not seem to be intrusive as weeds. In a bulletin of the Cornell University Experiment Station, Professor Prentiss names four species which have attracted attention as weeds which give some trouble in the central counties of New York. These are Solidago nemoralis, which drives out grasses in upland orchards, where the soil is cold and sterile; S. rugosa, which is less likely to be found on poor soil; the tall and stately S. Canadensis, which is common on field-borders, though less likely than the others to overrun the soil completely, although it is very persistent when established; S. lanceolata, which belongs more especially to moist meadow-lands and the banks of streams, and is more likely than any other species to become troublesome, owing to the fact that its power of propagation by underground stems is greater than that of the other species.

Dr. Laurence Johnson, who died in New York on the 18th instant, had devoted especial attention to the medical properties of North American plants and was the recognized authority in this country in this department of science. His *Manual of the Medical Botany of the United States*, in two handsomely illustrated volumes, is the standard work on the subject. Dr. Johnson, who was born in Wayne County, in this state, in 1845, was, at the time of death, a member of the Board of Managers of the New York Physicians' Mutual Aid Association, of the New York Society for the Relief of Widows and Orphans of Medical Men, of the Medical Society of the State of New York, of the New York Academy of Medicine, of which at one time he had been the librarian and at the time of his death was a trustee, and a lecturer on medical botany in the University of the City of New York.